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Ron H. McPeak
San Diego Natural History Museum

Paul K. Lago
University of Mississippi

Guy A. Hanley

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Two New Sulcate Species of *Dichelonyx* Harris (Coleoptera: Scarabaeidae: Melolonthinae: Dichelonychini) from Southern California, USA and Baja California, Mexico

Ron H. McPeak
Department of Entomology, San Diego Natural History Museum
P. O. Box 121390
San Diego, CA 92112-1390, USA
ronmcpeak@comcast.net

Paul K. Lago
Department of Biology, University of Mississippi
University, MS 38677, USA
plago@olemiss.edu

and

Guy A. Hanley
2502 10th Avenue NW
Minot, ND 58703, USA
ghanley701@gmail.com

Abstract

Species of *Dichelonyx* Harris with a sulcate pronotum and from southern California, USA and Baja California, Mexico are treated in this paper. *Dichelonyx magnesae* McPeak and Lago, **new species**, and *Dichelonyx bajaensis* McPeak and Lago, **new species,** are described. The new species are illustrated, diagnostic characters to separate them from previously described species are discussed, and a key to "sulcate" *Dichelonyx* species from southern California and Baja California is presented.

Key Words: taxonomy, biodiversity, scarab beetles, descriptions, key, Nearctic

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Introduction

Dichelonyx Harris, a Nearctic genus belonging to the tribe Dichelonychini, is distributed across the North American continent, with most species occurring in western North America. Smith (2009) listed 25 species in North America, 11 occurring in California. The genus has long needed revision, with the last major works on *Dichelonyx* published by Saylor (1946) and Brown (1946). Cornell (1971) revised the genus for his PhD dissertation, but this work was never published.

Dichelonyx species are elongate, subparallel beetles with the elytra ranging in color from testaceous to piceous, and often iridescent green or blue. Size varies from 5.7 mm for *Dichelonyx nana* (Fall) to 13.7 mm for *Dichelonyx vicinus* (Fall). The dorsal and ventral surfaces are setose, the venter more densely so. The elytral setae are sometimes arranged in distinct longitudinal lines (vittae), and, in six species, the pronotum bears a single longitudinal sulcus medially. Males are distinguished by a larger antennal club and the abdomen in profile flat or feebly concave. The female abdomen is more robust and convex in profile, while the antennal club is relatively shorter. The shape of the parameres is of limited diagnostic value in this genus, but shape, position, and number of sclerites associated with the internal sac (aedeagus) are often species specific (Cornell 1971).

Adults of a few *Dichelonyx* species are diurnal, but most are nocturnal and often abundant at lights. Day-flying adults feed on flowers or pollen, while the nocturnal species feed on foliage (Evans 2002). Chamise (*Adenostoma fasciculatum* Hook. & Arn., Rosaceae) is a favorite food plant throughout southern California and Baja California, Mexico. Flight activity for the various species generally occurs during the spring and early summer.

Two new *Dichelonyx* species are described herein. *Dichelonyx magnesae* McPeak and Lago, new species, was discovered at several sites in San Diego County, California as part of the San Diego County Scarab Project (McPeak and Oberbauer 2008; McPeak *et al.* 2014). Additional specimens of this species were collected at locales in Riverside County, California and Baja California, Mexico. A second undescribed species, *Dichelonyx bajaensis* McPeak and Lago, new species, initially discovered in the California Academy of Science material collected in Baja California, Mexico, was also found in material from San Diego County. Both new species are similar to *Dichelonyx pusillus* LeConte and have been confused with this species in collections.

Material and Methods

During this study, we examined nearly 1,100 sulcate specimens of *Dichelonyx* from southern California and Baja California, of which 228 represent the two new species herein described. Southern California is defined here as the California counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and San Diego. Representatives of the new species were deposited in the following private and museum collections:

AVEC	Art V. Evans Collection, Richmond, Virginia, USA
CASC	California Academy of Sciences Collection, San Francisco, California, USA
CSCA	California State Collection of Arthropods, Sacramento, California, USA
EMEC	University of California, Berkeley, California, USA
FSCA	Florida State Collection of Arthropods, Gainesville, Florida, USA
LACM	Natural History Museum of Los Angeles County, Los Angeles, California, USA
OJSM	Orma J. Smith Museum of Natural History, Caldwell, Idaho, USA
PKLC	Paul K. Lago Collection, Oxford, Mississippi, USA
RACC	Richard A. Cunningham Collection, Show Low, Arizona, USA
RHMC	Ron H. McPeak Collection, Vancouver, Washington, USA
SBMNH	Santa Barbara Museum of Natural History, Santa Barbara, California, USA
SDNHM	San Diego Natural History Museum, San Diego, California, USA
TAMU	Texas A&M University Collection, College Station, Texas, USA
UCDC	University of California, Davis, California, USA
WBWC	William B. Warner Collection, Chandler, Arizona, USA
WFBM	William F. Barr Entomological Museum, Moscow, Idaho, USA

In describing the following species, we apply the phylogenetic species concept outlined by Wheeler and Platnick (2000), in which species are defined as the smallest aggregation of populations diagnosable by a unique combination of character states. As Ratcliffe (2013) suggested "Not all species are equally diagnosable. Some are easily recognized by examining one individual with a unique set of characters, and some must be proposed only after many individuals from different populations are examined." The later observation became readily apparent during our studies of the *Dichelonyx* and *Coenonycha* Horn of San Diego County.

In recording label data in the following list, letters [a), b), and c)] designate different labels, while a slash "/" signifies a new line on that label. In the descriptions, the term funicle describes the stem of the antenna, minus the scape.

Results

Dichelonyx magnesae McPeak and Lago, new species

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(Figs. 1–10)

Type Material. 66♂, 128♀. Holotype labeled: a) "USA:CA:San Diego Co., / Aguanga Mtn. / 4.2 mi W Hwy 79 on / 9S07 Rd, 4200', BL & MV"; b) "33°19.587'N, 116°44.925'W / 14-15 June 2012, leg. R. H. / McPeak & R. A. Cunningham"; c) on red paper, "HOLOTYPE / *Dichelonyx magnesae* / McPeak & Lago" (1♂ CASC) (Fig. 1). Allotype female labeled as holotype except for c) on red paper "ALLOTYPE / *Dichelonyx magnesae* / McPeak & Lago" (1♀ CASC). Paratypes, each with our yellow paratype label: 43♂ and 92♀ with same label data as holotype (2♂, 2♀ CASC; 2♂, 2♀ CSCA; 2♂, 2♀ AVEC; 2♂, 2♀ EMEC; 2♂, 2♀ FSCA; 2♂, 2♀ LACM; 2♂, 2♀ OJSM; 2♂, 2♀ PKLC; 8♂, 25♀ RACC; 7♂, 39♀ RHMC; 2♂, 2♀ SBMNH; 2♂, 2♀ SDNHM; 2♂, 2♀ TAMU; 2♂, 2♀ UCDC; 2♂, 2♀ WBWC; 2♂, 2♀ WFBM); 15♂ with label data same as holotype, except a) "blacklight"; b) "5 July 1992, R. H. McPeak" (2♂ CASC; 8♂ RHMC; 5♂ SDNHM); 2♂ labeled "Lake Henshaw / San Diego Co., CA / V-25-92, At light / W. F. Chamberlain" (2♂ TAMU); 1♀ labeled "CA:San Diego Co., / Warners, / VI/25/1925" (1♀ CASC); 1♀ labeled "CA:San Diego Co. / 1.5 mi W. of Warner / Springs on Hwy 79 / 2900' VII-5-92 / R. H. McPeak" (1♀ RHMC); 1♀ labeled "CALIF:San Dgo. Co. / 7 mi.

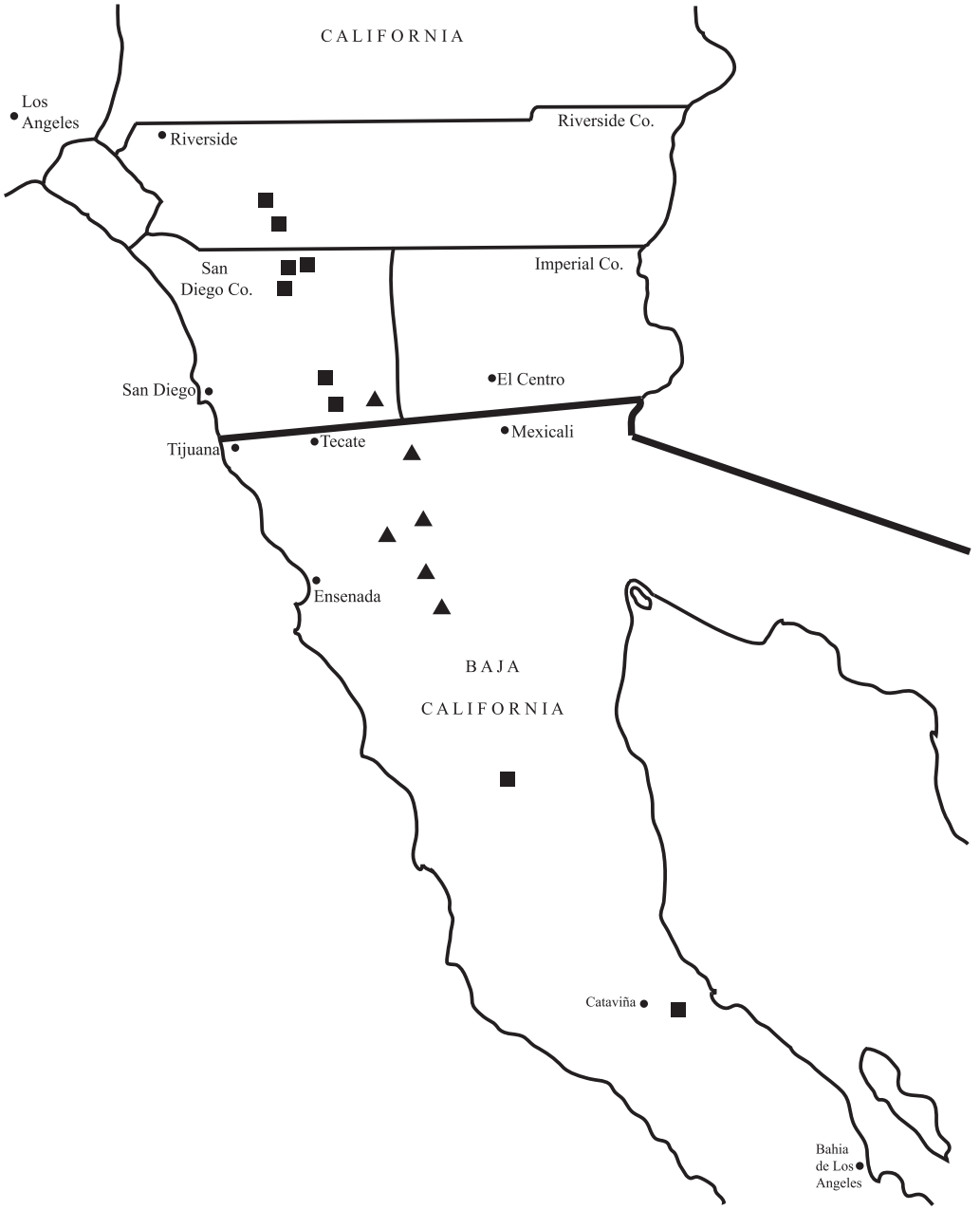


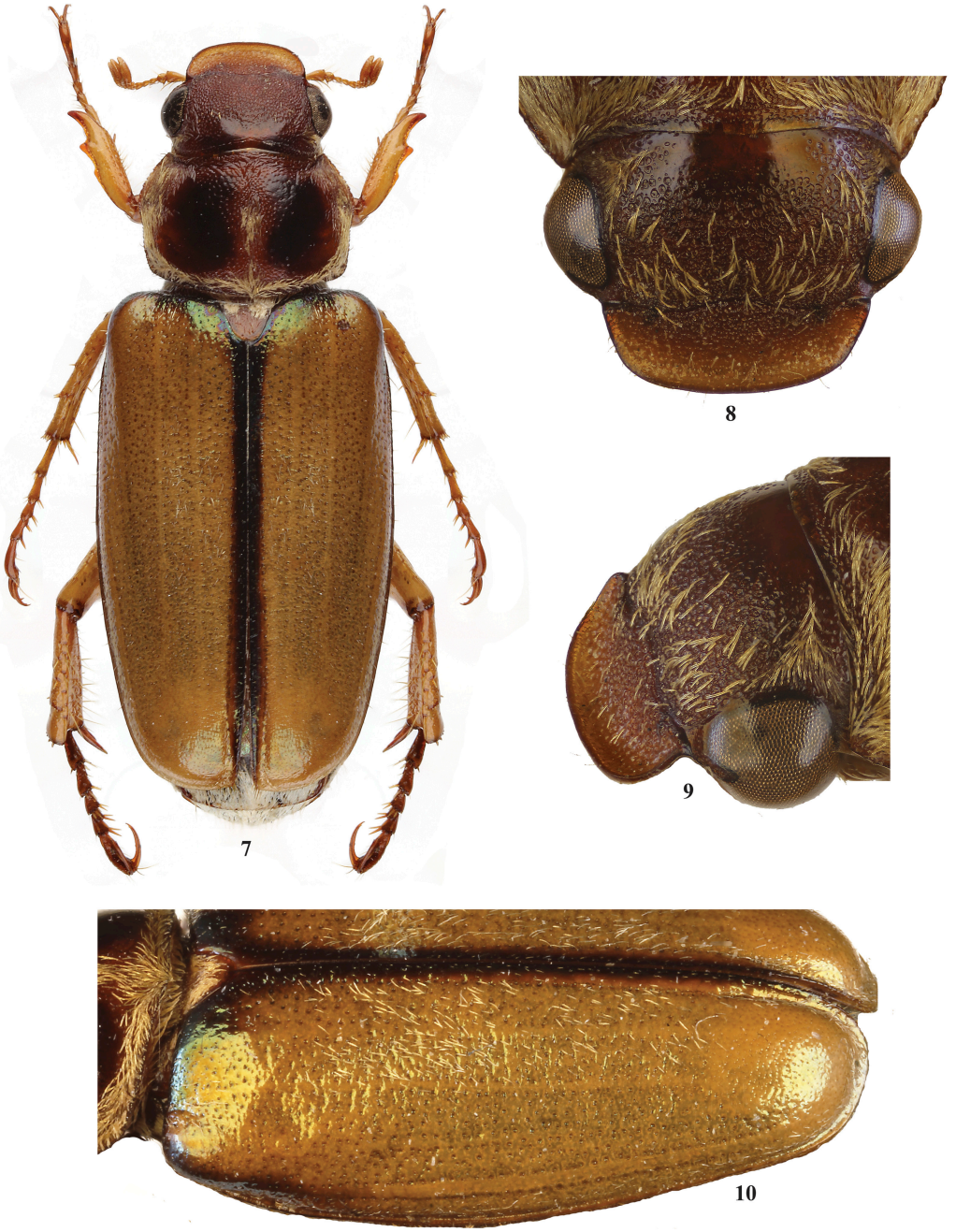
Fig. 1. Distribution of *Dichelonyx magnesae*, **new species** (■) and *Dichelonyx bajaensis*, **new species** (▲) in southern California, USA and Baja California, Mexico.

NNW Warners / Sprs, Indian Flats / Campgd., VIII-20-76 / P. Rude collector"; b) "*Adenostoma"* (1♀ EMEC); 1♂, 2♀ labeled "Pine Valley / San Diego Co, Calif / VI/28/86 / R. H. McPeak" (1♂, 2♀ RHMC); 1♂ labeled "USA:CA:San Diego Co. / Buckman Springs. Rd., / 1.5 km S Cottonwood / Crk.; 32.706°, -116.490° / June 17, 2017; at UV / light; W. B. Warner" (1♂ WBWC); 22♀ labeled "Bautista Canyon / 7 mi. SE Hemet / Riv. Co. Calif. / 23-June-1970"; b) "Black lite / J. Saulnier" (5♀

Figs. 2–6. *Dichelonyx magnesae*, **new species**, male. **2)** Habitus; **3–4)** Head, dorsal and oblique views, respectively; **5)** Non-vittate elytra; **6)** Parameres.

RACC, 17♀ RHMC); 2♀ labeled "Bautista Canyon / 7 mi. SE Hemet / Riv. Co., Calif. / 23-June-1985"; b) "R. A. Cunningham coll." (2♀ RACC); 4♀ labeled "Bautista Canyon / 13 mi. S. San Jacinto / Riverside Co., Calif. / VI/27/1972 / S. Bennett" (4♀ RHMC); 2♂ labeled "Coahilla Mtn. Trail / San Bern. Nat. Forest / Riverside Co. Calif. / VII/3/1972 / S. Bennett" (2♂ RHMC); 1♀ labeled "MEXICO: Baja Calif / 12 mi E Cataviña / 4 VI 1997 / light sheets"; b) "William D. Shepard leg." (1♀ RHMC); 1♀ labeled "MEXICO: Baja Calif. / Mike's Sky Rancho / 3 VI 1997 / light sheets"; b) "William D. Shepard leg." (1♀ RHMC); 1♂ labeled "MEX., BajaCalif. N, Sierra / Juarez 5 mi. N La / Huerta, VI-9-70 / E. L. Sleeper collr."; b) "California State / Univ. Long Beach / 1996 donation to / Calif. Acad. Sci." (1♂ CASC).

Description. Holotype male. Length 7.4 mm. Head and pronotum medium brown; elytra paler,



Figs. 7–10. *Dichelonyx magnesae*, **new species**, female. **7)** Habitus; **8–9)** Head, dorsal and oblique views, respectively; **10)** Non-vittate elytra.

yellowish brown or testaceous with light green luster (Fig. 2). Dorsum and venter setose, setae golden-yellow dorsally, light yellow ventrally, with density varying from sparse to dense, glabrous patches present on vertex, pronotum, elytra, and mesosternum. **Head:** Clypeus strongly reflexed, anterior angles broadly rounded, anterior margin truncate, lateral margins divergent to base; surface densely and coarsely punctate; frontoclypeal suture sinuate, with the center extending farther posteriorly than the lateral arms. Clypeus and

head uniformly covered with dense, posteriorly directed, prostrate setae, except for a broad, glabrous, impunctate triangle on vertex (Figs. 3–4). Antenna testaceous or slightly infuscate, with 9 antennomeres, club approximately same length as funicle. Maxillary palpus testaceous or slightly infuscate, terminal segment nearly cylindrical, base and apex abruptly narrowed. **Pronotum:** Lateral margins obtusely angulate at apical 1/3, edges straight, shallowly crenulate before and after angulation; anterior angles nearly 90°, posterior angles obtuse but apparent; midline vaguely depressed (sulcus), more heavily punctate than adjacent smooth areas; disc in lateral half and along apical and basal margins densely punctate and setose, setae obscuring surface. Disc with 2 more or less rectangular, mostly glabrous, finely and sparsely punctate maculae on either side of midline. Scutellum densely setose. **Elytra:** Color primarily testaceous, with light metallic green reflections; suture, base, and portions of lateral margins infuscate, infuscation narrowly outlining scutellum, extending across anterior face of humeral umbone and lateral margin under and slightly behind umbone; setae recumbent, much sparser than pronotum, most numerous mesad of a line drawn from humeral to apical umbones, without bare costae (not vittate); laterally, setae shorter, semi-erect, and less obvious (Fig. 5). Discal costae vaguely indicated. **Venter:** Meso- and metathoraces and abdominal sternites covered with light yellow (appearing light gray because of dark integument beneath), plumose, scale-like setae. Metacoxae, metepisternum, mesepisternum, anterior region of proepimera, pygidium, and posterior 2/3 of propygidium very densely setose. Metasternum densely setose on lateral thirds, but central disc nearly glabrous except for a few suberect, simple setae. Proepimeron setose anteriorly, with transverse glabrous area posteriorly. **Legs:** Testaceous. Metatibial spurs unequal in length, with short spur 0.7× length of long spur; both spurs rather narrow with base slightly enlarged, longer spur parallel-sided, gently curved, narrowly rounded apically; shorter spur narrowed from base to apex. **Genitalia:** Parameres typical for genus; in lateral view, dorsum slightly angulate, apical lobes relatively robust, with down-curved, acute apices (Fig. 6). Internal sac without sclerites.

Allotype Female. Length 8.4 mm. Anterior clypeal angles broadly rounded and lateral margins divergent at base (Figs. 7–9). Antennal club about half length of funicle. Coloration similar to male, except glabrous areas of pronotum larger with better defined borders, narrowly infuscate margins of elytra slightly more extensive across anterior margin and under humeral umbone, lateral marginal bead of elytra infuscate along entire length (Fig. 10). Elytral pubescence similarly distributed, but obviously shorter, area between discal patch and outer setose interval with short "microsetae," barely longer than diameter of punctures from which they emerge. Abdomen robust, convex ventrally in profile, rather than flattened or concave as is characteristic of males. Other external characters similar to male.

Variation. *Dichelonyx magnesae* males range from 6.9 to 8.3 mm in length, while females range from 7.7 to 8.9 mm. In typical (most common) specimens and darkest specimens, the two large, impunctate, glabrous rectangles on either side of the depressed pronotal midline (sulcus) are dark reddish brown or piceous, with the densely punctate medial depression, anterior, posterior, and lateral areas setose and light reddish brown (color differences may be difficult to see on densely setose individuals). In pale specimens, the pronotum may be uniformly light reddish brown. The maculae vary from completely bare to uniformly covered with sparse setae, but the areas are always distinct from the densely punctate, generally densely setose marginal areas. The shape of the maculae is variable, rectangular to rounded, sometimes coalescing anteriorly to form an inverted, cordate, unified macula.

The darkened margins on the elytra usually extend from the lateral margin across the anterior face of the elytra, including irregular incursions on the base of the disc, along the lateral margins of the scutellum, and the complete length of the sutural intervals, but never including the dorsal surface of the humeral umbone. The darkest specimens may have the base more extensively, but unevenly, darkened, surpassing the tip of the scutellum medially by about the length of the scutellum, but not extending broadly along the suture. In addition, the lateral margins of the elytra may be darkened, including the anterior and lateral faces of the humeral umbone, anterior surfaces of the ninth costae, ninth interval, and marginal bead back to the level of the first or second sternite, and the lateral marginal bead may be darkened to the apex. The base color of the disc may be light reddish brown, but this is uncommon. In the palest specimens, most basal infuscations may be absent, with only the margins along the scutellum and extreme inner margins of the sutural intervals clearly darkened. Elytral setae are densely spaced over the entire surface in males and on the central disc in females (often missing apically, basally, and occasionally medially in females), generally not interrupted by glabrous costae. Rarely, males have the third costa vaguely visible through the setal coat.

Natural History. A single specimen was taken on *A. fasciculatum* (chamise). All other specimens from San Diego County (161) were taken at blacklight or mercury vapor light in chaparral habitat. The most southerly specimen examined was labeled 12 mi. E of Cataviña, Baja California, Mexico (Fig. 1). The habitat east of Cataviña is Central Desert, dominated by several species of cacti, elephant trees, and boojum trees. We suspect that this specimen was mislabeled and is from another locality.

Etymology. *Dichelonyx magnesae* is named in honor of Mary Agnes McPeak, wife of the first

author. Mary was frequently called "Magnes" and the person who urged the first author to take a course in entomology taught by Dr. E. L. Sleeper. Her entomological urging resulted in a life-long interest in scarab beetles by the first author.

Diagnosis. Males of *D. magnesae* are distinguished from *D. bajaensis* males by their rounded to broadly rounded anterior clypeal angles (Figs. 3–4); yellow or gold setae that are evenly distributed over the entire elytral surface or, occasionally, less dense on lateral third (Figs. 2, 5); third and fifth costae rarely glabrous, forming thin lines in discal setal patches; and parameres in lateral view with dorsum slightly angulate, apical lobes relatively robust, with down-curved, acute apices (Fig. 6). Males of *D. bajaensis* have anterior clypeal angles nearly 90º (Figs. 11–13); elytra clearly vittate (Fig. 14) or not (Fig. 15); and parameres in lateral view slightly angulate dorsally, but angulation less evident than in *D. magnesae,* with down-curved, acute apices sharper than in *D. magnesae* (Fig. 16). Males of *D. pusillus* are distinguished from *D. magnesae* and *D. bajaensis* males by their typically uniform dark brown coloration and white or silvery white elytral setae that are generally distributed in distinct vittae, but occasionally not (Fig. 20).

Females of *D. magnesae* are distinguished from those of *D. bajaensis* by the broadly rounded clypeal angles (Figs. 8–9) and typically testaceous elytra with the suture completely darkened but never expanded into a broad triangular area surrounding the scutellum (Fig. 7). Females of *D. bajaensis* have elytral coloration typically testaceous, with the suture completely darkened and expanded into a broad triangular or, rarely, rectangular area around the scutellum (Fig. 11). The clypeal angles of *D. bajaensis* are not broadly rounded as in *D. magnesae* (Figs. 18–19). Females of *D. pusillus* are distinguished from those of *D. magnesae* and *D. bajaensis* by the dark coloration and white or silvery white elytral setae (Fig. 25).

Dichelonyx bajaensis McPeak and Lago, new species

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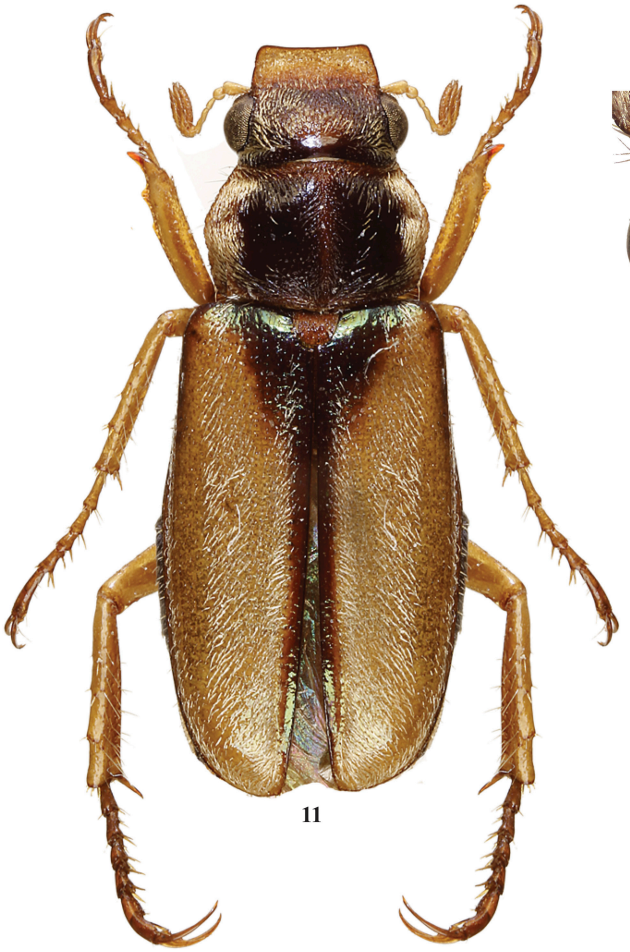
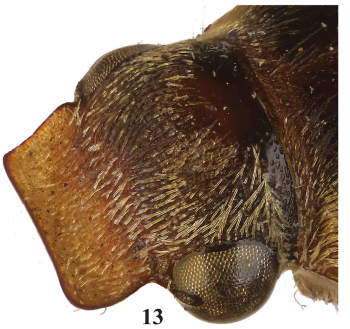
(Figs. 1, 11–19)

Type Material. 21♂, 13♀. Holotype labeled: a) "B. CALIF. N., / Sa. Juarez 13.5 mi. / S El Rayo"; b) "E. L. Sleeper / Collr. VI-8-70"; c) "California State / Univ. Long Beach / 1996 donation to / Calif. Acad. Sci." (1♂ CASC) (Fig. 1). Allotype female labeled as holotype (1♀ CASC). Paratypes, each with our yellow paratype label: 3♂, 5♀ with same label data as holotype (3♂, 5♀ CASC); 2♂, 2♀ labeled "B. CALIF. N. / 2.2 mi. S / El Topo VI-6-70"; b) "E. L. Sleeper / Collr."; c) "California State / Univ. Long Beach / 1996 donation to / Calif. Acad. Sci." (2♂, 2♀ CASC); 2♂, 2♀ labeled "B. CALIF. N., / Sa. Juarez 3.6 mi / SE El Rayo"; b) "E. L. Sleeper / VII-2-60 Collr."; c) "California State / Univ. Long Beach / 1996 donation to / Calif. Acad. Sci." (2♂, 2♀ CASC); 8♂, 1♀ labeled "MEXICO: BajaCal. Norte / Sierra Juarez, 3 mi. / S. of Mexicali-Tecate / Hwy. along road to"; b) "El Topo Ranch 20-VI- / 1973 S. C. Williams & / K. B. Blair CSW # 313" (8♂, 1♀ CASC); 1♂, 1♀ labeled "MEX., BajaCalif. N, Sierra / Juarez 5.7 mi. N Rosa / del Castilla, VI-10-70 / E. L. Sleeper Collr."; b) "California State / Univ. Long Beach / 1996 donation to / Calif. Acad. Sci." (1♂, 1♀ CASC); 1♂ labeled "B. CALIF. N. / 10 mi. E San / Jose Castillo"; b) "Blacklight"; c) "E. L. Sleeper / Collr." d) "California State / Univ. Long Beach / 1996 donation to / Calif. Acad. Sci." (1♂ CASC); 3♂, 1♀ labeled: "CA:San Diego / Boulevard / at light, VI-9-94 / R. H. McPeak." (2♂, 1♀ RHMC; 1♂ PKLC).

Description. Holotype male. Length 6.2 mm. Clypeus light brown, frons and vertex dark reddish brown; pronotum similarly bicolored, glabrous rectangles on either side of midline dark reddish brown, midline and all marginal areas light brown; elytra primarily yellowish brown or testaceous, with suture, broad, triangular area surrounding scutellum, base across anterior face of humeral umbone, and lateral marginal bead infuscate (Fig. 11). Dorsum and venter covered with sparse to dense, recumbent setae; vertex, pronotal disc laterad of midline, and central metasternum glabrous and shiny. **Head:** Clypeus strongly reflexed, anterior angles narrowly rounded; *en face*, anterior margin truncate (Figs. 12–13): viewed from above and behind, anterior angles prominent with anterior margin concave between them, lateral margins nearly straight, parallel to base; surface densely and coarsely punctate; fronto-clypeal suture sinuate, arcuate posteriorly in middle. Clypeus and head covered with dense, posteriorly directed, prostrate, golden-yellow setae, except vertex glabrous and distinctly punctate laterally, impunctate medially. Antennae testaceous, with 9 antennomeres, club approximately same length as funicle. Maxillary palpi testaceous or light brown, terminal segment nearly cylindrical, base and apex narrowed. **Pronotum:** Lateral margins obtusely angulate just before mid-length, straight and coarsely but shallowly crenulate before and after angulation; anterior angles slightly obtuse, posterior angles broadly obtuse but evident; midline vaguely depressed; rectangular areas on either side of midline glabrous, slightly raised, with scattered fine punctures and few sparse setae. Apical and basal regions, depressed midline, and lateral thirds densely punctate and covered with light yellow or dirty white setae that obscure pronotal surface. Scutellum densely setose. **Elytra:** Color primarily testaceous, with suture,

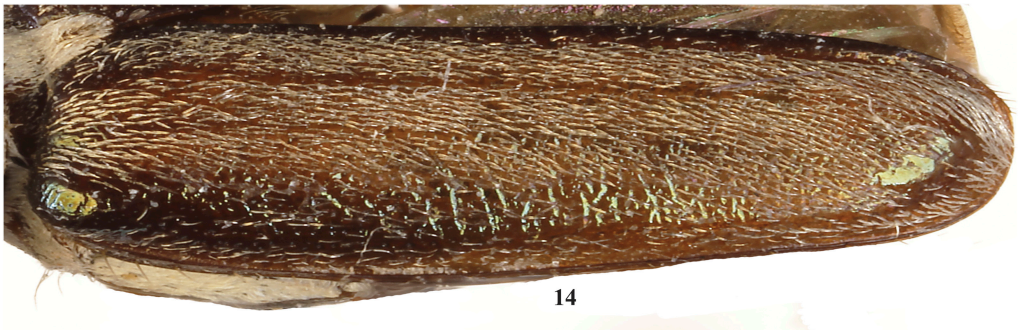




Figs. 11–13. *Dichelonyx bajaensis*, **new species**, male. **11)** Habitus; **12–13)** Head, dorsal and oblique views, respectively.

base, anterior face of humeral umbone, and lateral marginal bead dark brown to piceous, darkened areas exhibiting light metallic green reflections; recumbent setae dense in medial half of each elytron, sparse and scattered near base; 1st discal costa apparent, slightly dividing setose field basally, becoming indistinct in apical half, other discal costae indistinct, except for distinct submarginal (9th) costa; area between discal setose field and submarginal costa sparsely covered with short setae, appearing nearly glabrous in middle, space between submarginal costa and lateral margin with long, relative sparse setae; humeral umbone and irregular areas adjacent to scutellum glabrous, or nearly so (Figs. 11, 14–15). **Venter:** Meso- and metathoraces covered with white, recumbent setae. Metasternum densely setose on lateral thirds, with disc glabrous except for scattered suberect simple setae. Metacoxae, metepisternum, mesepisternum, lateral regions of proepimeron, pygidium, and posterior 2/3 of propygidium densely setose. Proepimeron setose anteriorly and posteriorly, but with transverse glabrous area beneath lateral angle. **Legs:** Testaceous. Metatibial spurs unequal in length with short spur 0.7× length of long spur; both spurs rather narrow, longer spur parallel-sided, narrowly rounded apically; shorter spur narrowed from base to apex. **Genitalia:** Parameres typical for genus, slightly angulate dorsally, angulation less evident than in *D. magnesae*, apically elongate lobes less robust in lateral view compared to those of *D. magnesae*, with down-curved, acute apices sharper than apices in *D. magnesae* (Fig. 16). Internal sac without sclerites.

Allotype Female. Length 6.7 mm. Antennal club about 0.7× length of funicle. Anterior clypeal angles



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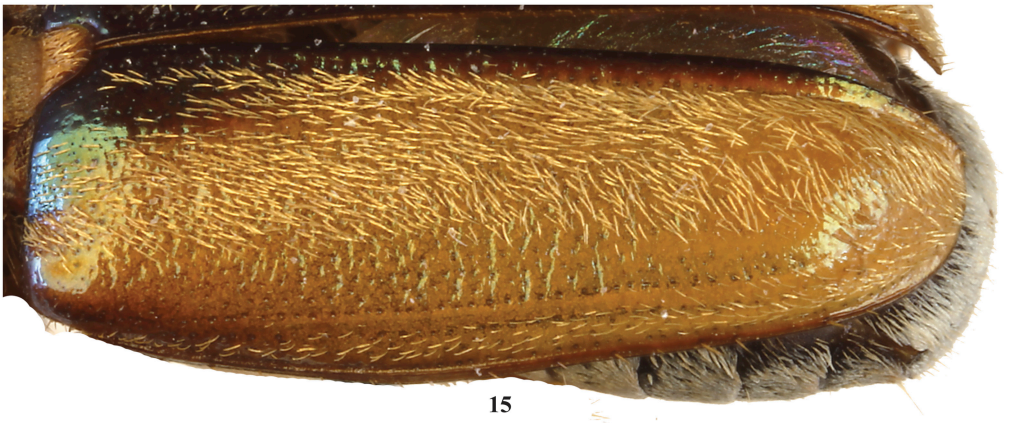

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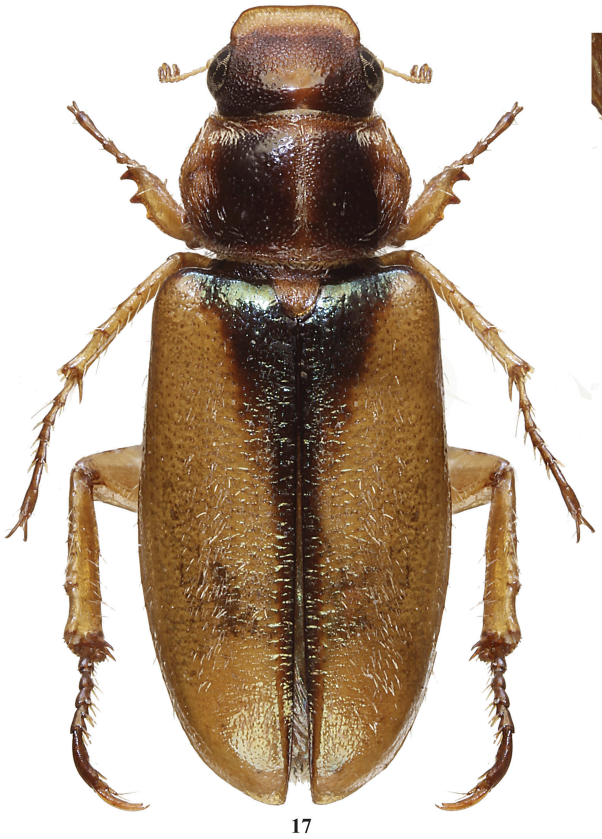
Figs. 14–16. *Dichelonyx bajaensis*, **new species**, male. **14)** Vittate elytra; **15)** Non-vittate elytra; **16)** Parameres.

rounded and lateral margins divergent at base (Figs. 17–19). Coloration similar to male, except glabrous areas of pronotum larger and bearing scattered setae basally and apically, infuscated triangle surrounding scutellum more extensive than in male (Fig. 17), humeral umbone with infuscate streak extending posteriorly about 1/3 elytral length, lateral marginal bead not infuscate.



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Figs. 17–19. *Dichelonyx bajaensis*, **new species**, female. **17)** Habitus; **18–19)** Head, dorsal and oblique views, respectively.

Elytral pubescence similarly distributed but shorter than in males, area between discal patch and outer setose interval apparently glabrous, but actually with short microsetae. Abdomen robust, convex ventrally in profile, rather than concave as is characteristic of males. Other external characters similar between the sexes.

Variation. *Dichelonyx bajaensis* males range from 6.0 to 7.8 mm in length, while females range from 5.7 to 8.0 mm. Typical specimens have bicolored pronotum and elytra. The glabrous rectangles on either side of the depressed pronotal midline are dark reddish brown or piceous, with the densely punctate medial depression, and anterior, posterior, and lateral areas setose and light reddish brown (color differences may be difficult to see on densely setose individuals). The "glabrous" rectangles vary from completely bare to uniformly covered with sparse setae, but the rectangles are always easily distinguished from the heavily punctate, densely setose midline and marginal areas. Unlike the condition seen in *D. magnesae*, uniformly brown individuals are common, and these show no difference in color between the different areas on the pronotum.

Like typical specimens of *D. magnesae*, the elytra of *D. bajaensis* are usually testaceous with darkened margins, the latter usually extending from the lateral margin across the anterior face of the humeral umbone, then invading the disc as a broad macula on either side of the scutellum and narrowing to the sutural interval just short of the midpoint of the elytra (rarely less than 3× length of scutellum). The margins of the macula are variable, sometimes projecting apically along the third costa, resulting in a somewhat rectangular appearance. The complete length of the sutural intervals is darkened, the lateral margins darkened to varying degrees, from a short line under the humeral umbone to broadly infuscate nearly to the apex. Brown individuals, both males and females, show considerable variation in coloration, but all lack the triangular elytral macula. Some are uniformly light brown on the pronotum and elytra, lacking elytral maculae and infuscate margins, or they may have the sutural intervals lightly infuscate. Others have the

Figs. 20–22. *Dichelonyx pusillus*, male. **20)** Habitus; **21–22**) Head, dorsal and oblique views, respectively.

pronotum and lateral and sutural margins darker than the elytral disc. Eighteen of 34 specimens examined were brown and lacked elytral maculae. In general, elytral setae are white, densely spaced medially (often missing apically and basally), without evidence of exposed costae, and mostly absent on lateral thirds in both sexes. Occasional individuals have the third costa (first costa apparent after sutural costa) glabrous in the basal half or intermittently bare for entire length. Fewer specimens have the third and fifth costae bare, or nearly so, for their entire length.

Natural History. Specimens of *D. bajaensis* were collected in chaparral habitat in Baja California, Mexico and San Diego County, USA. The species composition of chaparral varies depending on slope, aspect, and elevation. Chamise and red shank (*Adenostoma sparsifolium* Torrey) are widely present, accompanied by a mixture of *Ceanothus* L. (Rhamnaceae), *Arctostaphylos* Adans. (Ericaceae), and *Quercus* L. (Fagaceae). Specific data for the specimens collected in Baja California are not known. The four specimens

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Figs. 23–26. *Dichelonyx pusillus*. **23–24)** Female head, dorsal and oblique views, respectively; **25)** Female vittate elytra; **26)** Parameres.

collected at Boulevard, San Diego County, were taken at light.

Etymology. The first specimens of *D. bajaensis* discovered in the California Academy of Science collection are from Baja California, Mexico. The specific epithet recognizes the area of collection.

Diagnosis. *Dichelonyx bajaensis* is distinguished from *D. magnesae* and *D. pusillus* in the diagnosis for *D. magnesae*.

***Dichelonyx pusillus* (LeConte, 1856)**
(Figs. 20–26)

Dichelonycha [sic] *pusilla* LeConte 1856: 282.

Specimens of this species are typically uniformly dark brown, occasionally with the central elytral disc paler brown. The anterior clypeal angles of males (Figs. 20–22) and females (Figs. 23–24) are slightly rounded, with the lateral margins slightly divergent to the base. The pronotum is unicolored. The elytral setae are white or silvery white and generally distributed from margin to margin, but never densely spaced, often vittate, with third, fifth, seventh, and ninth costae glabrous (Fig. 25). The glabrous lines are generally more than half as wide as the setal bands. In some specimens, the setae are more evenly distributed, and the vittae are not at all apparent, but in these cases, the relatively sparse distribution of setae, along with the general dark coloration, is distinctive. The parameres are typical for genus, slightly angulate dorsally, with apically elongate lobes as robust in lateral view as those of *D. magnesae* or more so, with down-curved acute apices (Fig. 26). The internal sac lacks sclerites.

Dichelonyx pusillus occurs widely in the southern half of California. The species has also been taken in western Nevada and in Baja California, Mexico (Cornell 1971). The two new species occur sympatrically with *D. pusillus* only in the southern portion of its range.

***Dichelonyx vicinus* (Fall, 1901)**
(Fig. 27)

Dichelonycha [sic] *vicina* Fall 1901: 291.

Dichelonyx vicinus is the largest sulcate *Dichelonyx* species in southern California, ranging from 8.5 to 13.7 mm in length (Fig. 27). This species occurs at higher elevations (1,374–1,893 m in San Diego County), where adults eat needles of several species of conifers (Fall 1901). Specimens are frequently collected at light. It is readily distinguished from other sulcate species occurring in the area by its large size and bright metallic green or blue elytra. The species is common in San Diego County and presumably occurs in Baja California where similar coniferous habitats exist.

Key to the Species of *Dichelonyx* with Longitudinal Pronotal Sulci and from Southern California, USA and Baja California, Mexico

1. Elytra bright metallic green or blue; length 8.5–13.7 mm (Fig. 27) ..... ***Dichelonyx vicinus* (Fall)**
1′. Elytra testaceous (Fig. 2) to dark brown (Fig. 14), either lacking metallic sheen or with light yellowish green reflections; length generally less than 8.5 mm (specimens of *D. pusillus* may reach 9.0 mm, but these are never bright metallic green) 2
2. Males; abdomen flattened in lateral view, apical 2 segments slightly concave ventrally; antennal club relatively long, subequal to length of funicle (Fig. 2) 3
2′. Females; abdomen convex ventrally; antennal club shorter, about half length of funicle (Fig. 7) 5
3. Anterior clypeal margin truncate to slightly concave (most easily seen at an angle from above and behind the head), anterior angles nearly 90° (Figs. 12–13), narrowly rounded; lateral margins straight and parallel. Elytra not clearly vittate or vittate (Figs. 14–15). Typically, impunctate areas on pronotal disc dark brown, punctate areas testaceous, elytral disc testaceous, with suture, large triangular area surrounding scutellum, and anterior margin in front of humeral umbone infuscate, darkened areas showing metallic green reflections (some specimens fairly uniform brown with infuscate margins, but clypeal shape remains distinctive) (Fig. 11)..... ***Dichelonyx bajaensis* McPeak and Lago, new species**
3′. Anterior clypeal margin truncate to convex (most easily seen at an angle from above and behind the head), anterior angles slightly rounded to broadly rounded (Figs. 3–4, 21–22); lateral margins slightly to strongly converging anteriorly. Elytra vittate or not, dorsal coloration testaceous to dark brown 4
4. Elytra vittate, with longitudinal stripes of white or silvery, recumbent or semierect, coarse setae; costae glabrous or nearly so, often wide, nearly half to 2/3 as wide as setal stripe (Fig. 20). Dorsal coloration brown, typically unicolored, but occasionally central elytral disc lighter, rarely only elytral margins infuscate, generally without light yellowish green metallic reflections .... ***Dichelonyx pusillus* (LeConte)**
4′. Elytra without distinct vittae, discal setae fine and dense, yellow or gold, evenly distributed over entire surface, or less dense on lateral third (Figs. 2, 5); rarely 3rd and 5th costae glabrous, forming thin lines in discal setal patches, but these lines not more than 20% as wide as patches of setae and usually not visible beyond 2/3 elytral length. Dorsal coloration usually bicolored; glabrous patches on pronotum light to dark brown (Fig. 2), punctate areas usually lighter; elytra testaceous (rarely light brown), with suture, anterior margin, and lateral area under humeral umbone

Fig. 27. *Dichelonyx vicinus*, male habitus.

darkened (Fig. 2) (occasionally, lateral margin darkened to level of apical umbone; in palest individuals, only suture infuscate); all darkened areas may be expanded slightly in darkest specimens, darkened areas and entire elytral disc with light metallic reflections ……***Dichelonyx magnesae*** **McPeak and Lago, new species**

5. Elytra unicolorous, medium to dark brown, or with margins slightly darker than disc; pronotum unicolorous dark brown. Elytra vittate, with longitudinal stripes of white or silvery, recumbent or semierect, rather sparse, coarse setae; costae glabrous or nearly so, often wide, nearly half as wide as setal stripe…… …… ***Dichelonyx pusillus*** **(LeConte)**

5′. Elytra usually testaceous with suture and anterior margins very dark; pronotum with impunctate areas on either side of midline medium to dark brown, with midline and punctate lateral areas paler (surface often obscured by thick setal coat). Elytra usually not vittate, discal setae mostly recumbent, dense, often restricted to disc mesad of a line from humeral umbone to apical umbone; occasionally, 3rd and 5th costae glabrous, thus stripes of setae become apparent, but glabrous lines very thin, not exceeding 20% of setal patch width; discal setae may be absent or nearly so …… 6

6. Elytra typically testaceous, with suture completely darkened and expanded into a long, broad triangular area surrounding scutellum extending from near midpoint of elytra to inside humeral umbones (rarely, "triangle" is more like a rectangle), darkened area continuing across anterior face of elytra to lateral margin, which may be light or broadly darkened to the level of the apical umbone (dark, rather uniformly brown specimens are not uncommon); elytral disc generally covered with setae mesad of a line extending from humeral to apical umbones; clypeal margin nearly truncate when viewed from angle from above and behind, depth of recurved face uniform from side to side; setae on dorsal surfaces whitish …… ……***Dichelonyx bajaensis*** **McPeak and Lago, new species**

6′. Elytra typically testaceous with suture completely darkened, but never expanded into a long, broad, triangular area around scutellum, instead, base of elytra broadly darkened along scutellum and across anterior face of elytra to lateral margin, which may be pale or broadly darkened for 2/3 elytral length; occasional specimens uniformly light brown, but at least elytral sutural margin infuscate; elytral disc often nearly glabrous or inconspicuously setose; clypeal margin broadly rounded (viewed from angle from above and behind), recurved face deepest medially, shorter at sides; setae on dorsal surfaces, particularly on pronotum, yellow or golden …… ***Dichelonyx magnesae*** **McPeak and Lago, new species**

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